Upper Thames, eastwards along the Kennet, southwards to Salisbury, and westwards along the North Avon. The rainfall of this region is now observed at twenty-eight stations, and the daily amounts are printed *in extenso*, and the eye readily notes the maximum monthly fall at each station, these being printed in thicker type. On each monthly sheet the means of the previous ten years' observations are given for the ten stations at which observations have been made for the whole of that period. The mean annual rainfall of these stations for the past eleven years is 32·14 inches, the monthly maximum being 3·49 inches in October, and the minimum 1·82 inches in March. As contrasted with the more strictly central districts of England, the summer rainfall is relatively less, and the autumnal and winter rainfalls greater; and as contrasted with places more open to the Atlantic to west and south-westward, the rainfall is relatively greater in summer and less in winter. At seventeen stations observations have been made for at least six years, at which, if the averages be struck for the eleven years, differentiating where necessary, the largest mean rainfall is seen to be 40·32 inches at Corsham, near the summit of the long ridge separating the North Avon from its tributary Box Brook, and the smallest 29·76 inches at Pen Hill in the north on the high ground between the Thames and its tributary the Cole; —the former being one of the heights most open to winds from the Atlantic, and the latter one of the most sheltered heights from these winds. As regards annual amount and variation with season and configuration of surface, the rainfall of Wiltshire curiously resembles that of Deeside, Aberdeenshire. An excellent map showing the stations and their heights and the physical features of the county accompanies the Report.

*Pheasants: their Natural History and Practical Management.* By W. B. Tegetmeier, F.Z.S. Second Edition, greatly enlarged. (London: *The Field* Office, 1881.)

MR. TEGETMEIER is so well known as an authority upon pigeons and poultry of all kinds that everything which he writes on the subject of these birds is sure to be received with attention, and it is therefore scarcely a matter of surprise that a second edition of his well-known "Pheasant" book should have been called for. The work will be found invaluable to any one projecting the cultivation of pheasants either in the covert or in the aviary. After a brief review of the habits of pheasants in a wild state, the author gives ample information as to their management in preserves and in confinement, and also discusses the much-vexed question of the gapes and other diseases to which these birds are subject. The second portion of the work is devoted to the natural history of the common pheasant and its allies which are suitable for introduction into our woods, and also treats of the more gaudily-coloured Golden Pheasant, Monâl, and other species adapted for the aviary. Valuable experiences of the rearing of these birds and their habits in confinement are given by Mr. Tegetmeier, who seems to have spared no pains to make his book interesting and instructive. The illustrations have been executed on wood by the well-known artist Mr. T. W. Wood, who has evidently studied the birds in a state of nature; and although the plumage of the pheasant family does not lend itself readily to this style of illustration, the attitudes of most of the birds are happily rendered, while some of the figures representing the "showing off" of the male birds are excellently conceived.

*Nach Ecuador. Reisebilder.* Von Joseph Kolberg, S.J. Zweite vermehrte Auflage, mit einem Titelbild, 140 Holzschnitten und einer Karte von Ecuador. (Freiburg-im-Breisgau: 1881.)

THE Archbishop of Quito proceeded to Rome in 1869 to attend the meeting of the Vatican Council, and he bore with him a commission from Don Garcia Moreno, President of Ecuador, to obtain powers to establish a Polytechnic School and College for the Republic. As a result he sent to Quito, in 1870, two Germans and one Italian, members of the Society of Jesus, who should lay the foundation-stone of the establishment, and in 1871 Joseph Kolberg, the author of this quarto volume, followed. The murder of President Moreno in August, 1875, gave a death-blow to the new institution. During the five years of his sojourn in the country Kolberg had been in the habit of sending home notes of his various tours, sketches of the manners and customs of the people he met with, and this in a somewhat methodic manner, as might be expected from a professor of the higher mathematics. These notes and sketches were published from time to time in a publication called *Stimmen aus Maria-Loch*, and they embraced among others an account of the voyage out, of a visit to Chimborazo, and an account of the catastrophe of Havra (1868), and incidental to these latter chapters the author introduces a theory of volcanic eruptions which he evidently thinks the best fruit of his visit to Quito. All these varied sketches and others on the natural history and geography of the country were, at the "request of friends," re-published in one handsome illustrated quarto volume, which was indeed to have been dedicated to President Moreno, but is now dedicated to his memory. The first edition was edited by the author's friend, R. Cornelly, S.J., and was published in 1876. The present edition, which has been corrected and enlarged throughout, has been published under the author's own superintendence. Some of the wood engravings are new and interesting; others, such as those representing the flying-fish and the Coral Island, have well served their generation.

*Second Report of the United States Entomological Commission for the Years* 1878 *and* 1879. With Maps and Illustrations. 8vo, pp. 322, and Eight Appendices, pp. 74. (Washington: Government Printing Office, 1880.)

THIS Report of the three Commissioners (Prof. Riley, Dr. Packard, and Dr. Thomas) appointed to investigate the ravages of the "Rocky Mountain" and other locusts forms a handsome volume, got up in the exhaustive and elaborate manner so marked in all the U.S. Government publications. It is exceedingly difficult to give an adequate notice in a short space, on account of the varied nature of the subjects touched upon. Our readers will gather from this remark that "Economic Entomology" in the proper sense of the term by no means occupies the entire volume, nor is it entirely confined to the "Rocky Mountain" pest in particular. A large portion is occupied by an elaborate investigation of the habits of migratory locusts in all parts of the world, gathered from a host of publications, some of them of ancient date. The connection of meteorological influences with the migrations and development of North American locusts is fully examined. Chapters IX. to XI. treat on the anatomy of the locust, and form valuable contributions to the anatomy of insects in general, such as one would scarcely expect to find in a report of this nature; of these Chapters IX. and XI. are by Dr. Packard, and treat of the air-sacs and brain respectively; X. is by Mr. Minot, on general histology: these are illustrated by excellent plates. The "economic" chapters are more especially by Messrs. Riley and Thomas, and go exhaustively into the question, more especially as to attacking the insect in its breeding-places, experience proving that war waged against the migratory swarms is comparatively useless; in connection with this, suggestions of a very broad nature are made. The Government is advised to encourage settlement of waste lands and the making of railroads conducing thereto, to induce broad schemes for irrigation, to guard the present timber, and encourage the planting of forests, to effect judicious burning in the breeding-grounds, covering about 400,000

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square miles as now estimated, to institute efficient systems of observations and warnings, &c., &c. Prof. Riley treats on the natural enemies of the locust, and illustrates the chapter by a remarkably well-executed plate. The general conclusion arrived at is that the evil may be materially modified, although utter extermination is out of the question.

The lengthy appendices give replies to the official circular from those interested, in widely-separated districts, often showing great practical and frequently scientific knowledge, sometimes combined with the illogical conclusions at which agriculturists often jump. Then there is list of species of locusts, &c., collected in the Western States in 1877, with descriptions of new species, worked out by Mr. Scudder; the plate illustrating this is not so good as usual, and scarcely sufficient for scientific purposes. A general bibliography of locusts (chiefly compiled by Mr. B. Pickman Mann), from 1542 forwards, must have occasioned great labour, and is correspondingly valuable. Other appendices treat on the flight of locusts (translated from the Italian); on a journey to Utah and Idaho, by Dr. Packard; and a translation of Yersin's researches on the function of the nervous system in Articulates. The six large folded maps on thick paper seem to be admirably adapted to illustrate the points to which each is directed.

We do not think it is pretended that some of the most useful chapters from a scientific point of view have any special, or even indirect, bearing upon the subject of Economic Entomology. The investigation of a locust's brain, for instance, will hardly reveal the mental condition of the insect, and show us why it is prompted to migrate or be so maliciously inclined towards destroying the hopes of the agriculturist. We prefer to regard these portions of the report as an outcome of a liberal endowment of research, the application of which to the nominal subject for inquiry is not too rigidly enforced.

## LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

### Laurentian Gneiss of Ireland

ALLOW me to state that since writing the notice which appears in NATURE (vol. xxiv. p. 81), I have found that white crystalline marble has been described by Sir R. I. Murchison and Prof. Geikie as occurring in the Laurentian gneiss of Loch Maree, in Scotland. I had overlooked this statement, and was under the impression that limestone was absent from the Scottish Laurentian area. Its occurrence in both countries constitutes an additional point of resemblance. EDWARD HULL

Geological Survey of Ireland, May 31

### Resonance of the Mouth-Cavity

WILL you give a place in NATURE to the inclosed letter which has just reached me? The writer is an organist and teacher of music of great repute in the North of England. The experiments which he describes will, I believe, interest many of your readers as much as they do me.

Trinity College, Cambridge, May 20 SEDLEY TAYLOR

MY DEAR SIR,—Travelling the other day by express from Scarborough to London, I found myself unconsciously moving my lips as if whistling a tune, which however I was not actually doing. Without any other action than the simple movement of the lips, I very distinctly heard different sounds in my mouth. Persevering in the practice of this discovered power of producing sound, I soon accomplished a fairly satisfactory performance—audible only to myself—of "Home, sweet home."

As soon as the train came to a standstill I found myself powerless to repeat the performance, for there was then no response to the contortions which by this time had attracted the attention of my fellow-passengers, who doubtless thought that I was being conveyed to a lunatic asylum. On resuming our former speed the "power of sound" once more responded to my efforts.

At once I perceived that I had made a discovery of which I had never heard or read in any of the numerous works on acoustics that I have studied. I perceived that I could single out different sounds from the noise of the train by a simple alteration of the size of the resonance-cavity of my mouth.

On my return home it occurred to me that the force of vibration in the air from the note of a harmonium might be able to set up a sympathetic resonance of the mouth. To my delight I found that I was right.

It is known that if a tuning-fork of proper size be held to the open mouth the latter can be so shaped as to give a powerful resonance; but I believe it is not known that the mouth for *any* sound (above about middle C to $f'''$ or $g'''$) is able to give a very distinct resonance.

Further experiments showed me that not only can the primes of notes within this limit be heard, but that any of these sounds are very clearly heard when they are upper partials of low notes.

This can be tested at the harmonium. Holding down, say, G on the first line of the bass, the third and following partials up to about the fifteenth, can be most clearly heard. The same held good when I experimented with men's and boys' voices.

But the most striking results were obtained at the organ. Holding the low C of the 8 ft. trumpet, the partials from $e'$ to $f\sharp'''$ were most bright and clear. Other stops, according to their several qualities, yielded corresponding results. I tried in vain however to obtain resonance for a differential and summational tone.

When the upper partials of a compound sound are generated in the mouth, the sounds are so near that with careful adjustment beats come out very clearly.

It is well however to observe that the force or weakness of any single sound thus obtained depends greatly upon the distance from the source. JOHN NAYLOR

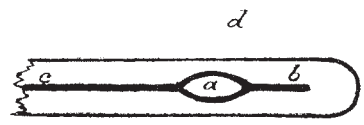
Scarborough, May 13

### Suggestion Relating to the Kew Standard Thermometers

I SHOULD like to suggest, through your columns, two slight changes in the manufacture of the Kew standard thermometers, which I think will commend themselves to any observers who often have occasion to use these beautiful instruments.

1. The calibrating chamber at the top of the thermometer is now made as in the figure, where *c a b* is the capillary column which expands at *a* into the calibrating chamber. Instead of being rounded off at *d* the capillary column is continued a short distance to *b*. This causes serious inconvenience in the transportation of the instrument, or in its calibration, because a small particle of mercury readily detaches itself from that in the chamber *a*, and once in *b* with a cushion of air between it and the remainder of the column, nothing but heat will dislodge it.

It does not require very great skill on the part of the glass-blower to form the chamber *a* by means of the pressure of the




mercury itself against the walls of the capillary column. The glass-blower, as is perhaps well known, can soften the finished tube at *a*, and while the glass is in this condition the gentle application of the flame to the bulb will force the mercury into the part at *a*, and the careful application of both flames will then form a pear-shaped cavity of a form which will not retain a particle of mercury, and is exceedingly convenient in use.

2. It is often desirable to hang these thermometers in a comparator or other place, and it would facilitate this if a glass ring were attached to the upper end, as is the case with the ordinary chemical thermometers. It is to be observed that the plane of this ring should be parallel to the enamelling in the tube.

It is often convenient to know the kind of glass used in the

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